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October 8, 1998

VIA HAND DELIVERY

Magalie Roman Salas, Esq.
Secretary
Federal Communications Commission
1919 M Street, N.W.,
Washington, DC 20554

Re: Reported order 96-208 Amending Parts 2 and 15 of the Commission's Rules to Deregulate the Equipment Authorization Requirements for Digital Devices
ET Docket No. 95-19
Notice of Oral Ex Parte Presentation

Dear Ms. Salas:

On Thursday, October 8, Doug Probstfeld and Peter Pitsch of Intel met with Dale Hatfield, Bruce Franca, Julius Knapp, Anthony Serafini, John Reid, Karen Rackley and Phillip Inglis of OET. During that meeting, the discussion included a review of a Market Facts survey conducted for Intel on EMI affecting TV and radio reception in the home and the costs and benefits of the FCC's Part 15 regulation of CPU boards. The attached handouts were presented.

Pursuant to Section 1.1206(b) of the Commission's Rules, an original and one copy of this letter are being submitted to the Secretary's office and a copy is being provided to Hatfield, Franca, Knapp, Serafini, Reid, Rackley and Inglis. Please inform me if any questions should arise in connection with this filing.

Respectfully submitted,

Peter K. Pitsch

Peter K. Pitsch

cc: Dale Hatfield
Bruce Franca
Julius Knapp
Anthony Serafini
John Reid
Karen Rackley
Phillip Inglis

Public Survey Data on EMC

Doug Probstfeld
Intel Corporation

September 24, 1998

Our Objective

- Provide new information from a public survey on interference from PCs.
- Come to a common understanding on the meaning of the data.
- Reconcile the data with FCC concerns about integration of CPU boards without test.
- Propose alternatives to Part 15 for CPU boards.

Historical Refresh

- FCC recently enacted new EMI Rules for CPU boards.
  - Significantly impacted deployment of new technology.
- Intel suggested alternatives.
  - Instead, received a stay & 3 dB relaxation.
- We asked again. The potential for another delay exists, but no change.
  - In the interim, the motherboard industry has no choice but to comply.

Why Did This Happen?

- We believe the FCC's goal was correct:
  - System integrators assembled custom PCs without testing.
  - FCC developed an assurance program that would fit them.
- The FCC chose to resolve at the source:
  - Previous Rules are based on CPU type & speed as "core".
  - PC integrators could use any enclosure, even plastic.
  - Mandated quieter CPU boards by a "cover off" EMI test.

Intel Commissioned a Public EMC Survey

- Industry was not getting complaints. We wanted to know for sure. Which EMI rules were necessary?
- Intel used Market Facts, Inc., an independent market research organization.
  - We have authorized availability of this data to anyone.
  - Lindsay Holbrook. 206-236-5970.
- 80,000 households queried. 55,529 responded.
- 23,994 (43.2% of respondents) reported having a PC in the home.

The Data Indicates That PCs Do Not Cause Significant Interference

In households with PC's:

- Only 0.3% experience radio interference from their PCs (3% of all their intermittent radio interference).
- Only 0.6% experience TV interference from their PCs (4% of all their intermittent TV interference).

The Data is Even More Significant Since It Applies to Compatibility Only

- This data applies only within a household, not the neighbor interference the FCC is focused on.
- Unable to gather interference data from neighbors.
- We anticipate far less neighbor interference (by orders of magnitude). There is no real problem out there.

Rural Areas

- As expected, rural households report overall radio & TV reception problems 3-4% higher than in metropolitan households, BUT
- The interference proportions are no different for households with PCs located in metropolitan areas and rural areas.
- With greater spacing between homes, neighbor EMI must be less than in metropolitan areas.

Data Suggests This is Due to Internal Noise Sources that are Sufficiently EMI-Quiet

- 44% of respondents indicated their PCs had no FCC logo or ID, and thus were assembled without consideration of EMI impact.
- Current radio & TV interference is not statistically different in homes with integrated computers vs. FCC marked devices.
- The FCC Rules work regardless of how PCs are assembled.

Older PCs are No More a Problem Than Newer PCs.

- In the few households currently experiencing intermittent radio interference, respondents are no more likely to attribute the interference to a newer (post 1995) computer than to an older one.
- Further, this data demonstrates that the selling and integration, without test, of CPU boards was not problematic, even when the motherboard industry was operating without an applicable regulation.

Based on the Data, is a Mandatory CPU Board Cover-Off Test Really Necessary?

- The data speaks for itself.
  - Very low relative interference levels from PCs.
  - Quiet internal noise sources regardless of end-product testing.
  - Similar low interference levels from PCs before CPU board integration was well regulated.
- This data does not seem to be a justification to add "constraints to deployment of new technology into the U.S. marketplace.".

The "Cover-Off" Test is Costly. All Passed On to the U.S. Consumer

- Most damaging is product launch delays. Several close calls. (Pentium® II Series, Seattle MB)
- Extra materials & manufacturing cost. (Est. $100 million extra for U.S. products in 1998).
- Radiated EMI test time & cost doubles for most testing. If "cover-on" limits not met when cover removed, must retest with the cover in place.
- Extra engineering. Intel's EMC staff doubled in 1.5 yrs.

Hurts Technology, Small Business

- Impacts processor & motherboard industries.
- The PC integration and motherboard industries are not well represented.
  - Companies disconnected. No industry associations.
  - Inadequate resources to effectively influence.
  - Integrators provide the latest technology at least cost.
- PC manufacturers, & test lab industry, are very well represented, yet there are over 60,000 U.S. integrators vs. 15 multinational PC companies.

"Cover-off" Test Problems

- **Not Realistic:**
  - **Board emissions not related to enclosure shielding.**
  - **Renders the "cover-off" test meaningless.**
- **Not Equitable.**
  - **Intel provided "cover-off" test data for 10 video boards. All failed, but they're legal & appear to have a great track record in the field.**
  - **A motherboard with similar emissions is illegal.**
- **Not Harmonized.**
  - **Other countries get latest CPU boards at lowest cost.**
  - **U.S. trade barrier. Impacts MRAs.**

"Cover off" Test Problems (Cont.)

- Inflexible. Based on PC Form & Function.
  - How does one test upgrade laptop boards? Tower chassis? Sealed PCs?
  - The result? Revision after revision of FCC Rules to adapt to latest technology as industry waits for each revision process.
- Public benefit is not justified with field data.
  - Field data confirms that enclosure variations were not a problem before instituting the "Cover-Off" Test.

Alternatives:

- Treat CPU boards the same as peripherals.
  - Eliminate the "Cover Off" Test in Clause 15.32(a)
  - Eliminate instructions requirements in Clause 15.102(a).
- Instructions, or pass the "Cover Off" Test.
  - CPU Boards passing "Cover Off" need not provide instructions, the same as peripherals.
  - CPU Boards that pass only the "Cover On" Test must include installation instructions for EMI.

Conclusion

- There is no public benefit.
- This is no small issue. Subtle but it has teeth.
- Hurts small business & U.S. consumers, but their complaints will likely not be heard.
- Please act quickly! If more time is needed, issue a sufficiently long delay.

Electromagnetic Interference Public Survey

May 1998

Conducted for Intel Corporation

By Market Facts, Inc.

Table of Contents

Background

- Government agencies and marketers of computers and computer components all have an interest in gaining a better understanding of the extent to which home computers generate electromagnetic interference (EMI) in the home.
- Such interference has the potential to affect reception of television and radio signals while these devices are in use in the home.
- While most branded computers are tested for the levels of EMI they generate, many integrated computers are not.
- Due to the fact that computers do generate some level of EMI, it has been hypothesized that
  - Homes with computers experience more radio and TV interference than homes without computers, and
  - Homes with integrated computers experience more radio and television interference than homes with branded computers.
- In addition, the level of EMI effecting TV and radio reception in the home may also be dependent on the following factors:
  - Presence of cable TV in the home: For television reception, homes with cable service should be less effected by EMI than homes without cable.
  - Proximity to population centers: Homes in more densely populated areas are more likely to be closer to TV and radio transmitters than homes in less densely populated areas, and thus should be less effected by EMI.

Research Objectives

- The primary objectives of this research are to
  - Determine the level of EMI experienced in U.S. Homes
  - Determine whether EMI levels are higher in homes with computers
  - Determine whether homes with integrated computers have higher levels of EMI than homes with branded computers that have not been modified.
- Additionally, the research was designed to determine to what extent the presence of cable TV and population density affect levels of reported EMI.

Methodology

- This study was conducted using Market Facts' Consumer Mail Panel (CMP), which is a proprietary population database consisting of over 500,000 households across North America that have been recruited to participate in mail and telephone surveys. In total, CMP represents the behavior and opinions of over one million consumers.
- The questionnaire for the EMI Public Survey was included with a packet of IBM-card sizes questionnaires that is sent monthly to a nationally balanced sub-sample of CMP households. This shared-client service, called Mini-Screen, allows costs for questionnaire printing and mailing to be shared among several clients, though each client's survey questions and results remain confidential to that client.
- The EMI questionnaire fit onto one side of an IBM-sized card and was mailed between April 1 and April 3, 1998 to 80,000 CMP households in the contiguous 48 states. The mail-out sample was balanced by five demographic characteristics to reflect national proportions as measured by the U.S. Census:
- Region (9 levels)
  - Annual household income (5 levels)
  - Population density (4 levels)
  - Age of household head (5 levels)
  - Household size (5 levels)
- After four weeks in the field, a total of 55,529 cards were returned, representing a response rate of 69.4%.

Analysis Notes

This research study is based on a sample, not a census, of U.S. households and therefore the percentages reported in this document should be regarded as estimates and are subject to variability. The following chart provides estimates of the variability associated with the estimates obtained within the various population subgroups analyzed. The bounds given are based on a confidence level of 95% and would apply to percentages estimated within that subgroup.

Population Subgroup	Base Size	Percentage Bounds
Total U.S. Households	55,529	± 0.4
Computer Households	23,994	± 0.7
With Non-Integrated PC	5,048	± 1.4
No FCC logo PC	7,932	± 1.1
FCC logo/modified PC	5,057	± 1.4
With Current Intermittent TV Reception Problems	3,563	± 1.7
And Non-Integrated PC	745	± 3.6
And No FCC logo PC	1,025	± 3.0
And FCC logo/modified PC	862	± 3.3
With Current Intermittent Radio Reception Problems	2,594	± 1.9
And Non-Integrated PC	623	± 3.9
And No FCC logo PC	768	± 3.5
And FCC logo/modified PC	625	± 3.9

- Throughout this report, where differences are noted as statistically significant, the 95% confidence level was used to determine differences.

Executive Summary

- Overall, about half of U.S. households have experienced some sort of TV reception problems in the past, though only about one in five are currently experiencing problems (Page 13).
- Fewer households report radio reception difficulties, with only about a quarter of households reporting any problems and fewer than one in seven indicating they are currently experiencing problems with radio reception.

- Households with computers (approximately 40% of households) are more likely to report that they are currently having reception problems with both TVs and radios, compared to households without a computer (Page 14).
- The proportion of computer households reporting current TV reception problems is nearly 4 percentage points higher than the proportion found in non-computer households (21.5% vs. 17.8%).
- The proportion of computer households reporting current radio reception problems is over 5 percentage points higher than the proportion found in non-computer households (16.4% vs. 10.9%)

- Households in rural areas (approximately 20% of households) are also more likely to report that they are currently having reception problems, both with the TVs and radios in the home, compared to homes in metropolitan areas (Page 15).
- The proportion of rural households reporting current TV reception problems is just over 3 percentage points higher than the proportion found in metropolitan households (22.0% vs.. 18.8%).
- The proportion of rural households reporting current radio reception problems is nearly 4 percentage points higher than the proportion found in metropolitan households (16.4% vs.. 12.6%).

Executive Summary

(continued)

- Households without cable TV (approximately 40% of households) are also more likely to report that they are currently having TV reception problems compared to households with cable TV (Page 16).
- The proportion of non-cable TV households reporting current TV reception problems is just over 10 percentage points higher than the proportion found in cable TV households (25.7% vs.. 15.4%).

- Approximately 21% of households were positively identified as having non-integrated computers, defined as having an FCC logo on the box (Page 17).
- Another 25% of households did not report the information required to make a determination.
  - The balance of computer households (54%) have integrated computers, defined as either no FCC logo on the box, or having an FCC logo but where a modification has been made (added/upgraded boards, drives, etc.).

- Current TV reception problems are more prevalent in homes where a computer has been modified than in homes where the computer is non-integrated or simply does not have an FCC logo (Page 18).
- The percentage reporting current TV interference is 2.2 percentage points higher in homes with modified computers (23.9%) than in homes with non-integrated computers (21.7%). This represents an additional 0.5% of computer households that may be experiencing TV interference due to non-integrated computers having been modified.

Executive Summary

(continued)

- Current radio reception problems are no higher in homes with integrated computers than homes with non-integrated machines (Page 18).

- Intermittent interference, the type caused by home computers, is by far the more prevalent type of EMI in all homes, with about two thirds of those with TV or radio interference problems indicating it is intermittent (Page 19).
- Homes with computers are slightly more likely to report intermittent TV interference, but they are also more likely to report continuous interference as well (Page 20).
- Homes with computers have no more intermittent radio interference than homes with no computer present (Page 20).

- Intermittent interference continues to make up the bulk of EMI in homes that are currently experiencing problems (Page 21).

Executive Summary

(continued)

- Overall, fewer than 1% of households with computers (0.6%) report that current intermittent TV interference is caused by the computer in the household (Page 22).
- This means 1 in every 162 computer households has current intermittent TV interference problems that may be directly attributed to a computer in the household.
- This rate is no different for computer households located in metropolitan areas and rural areas (Page 25).

- Even fewer households (0.3%) report current intermittent radio interference is caused by the computer (Page 22).
  - Households with computers in metropolitan areas are no different than those in rural areas in this respect (Page 25).

- The rates of current intermittent TV interference cause by computers are statistically no different among households with integrated and non-integrated computers (Page 23).
- Household with integrated computers due to modifying an FCC-tested model to report slightly more current intermittent radio interference than households with non-integrated computers. Radio reception may be more easily effected by EMI than TV reception (Page 24).

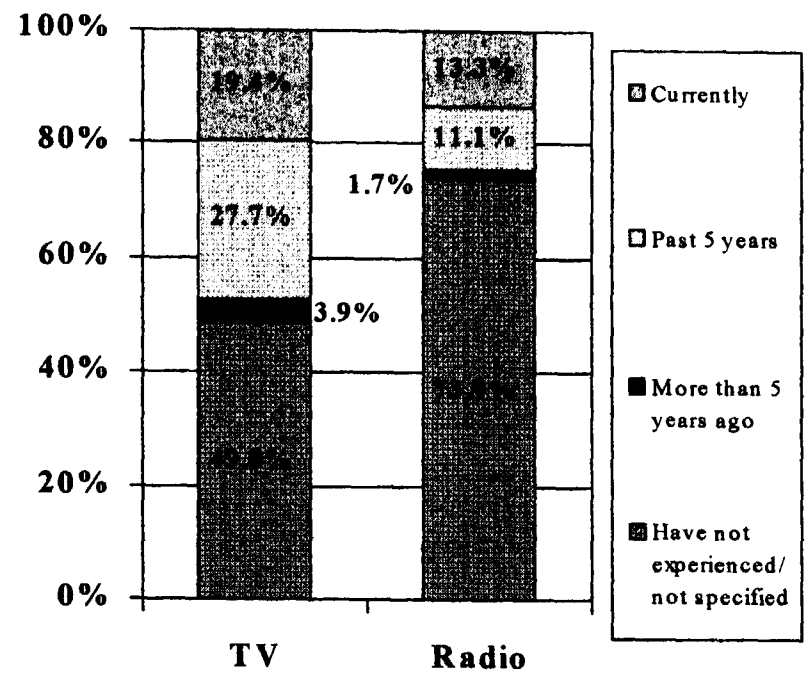
Implications

- As hypothesized, these study results indicate that computers may have an effect on radio and TV reception, with more current problems reported in homes where a computer is present than in homes without one.
- However, given the the rather modest magnitude of these differences, indications are that computers may be affecting at most an additional 2.4% of American homes .
- As was expected, higher levels of EMI were also reported in homes in rural areas and homes without cable TV.
  - Lack of cable TV effects a greater portion of households -- up to an additional 4% of American homes experience TV EMI that they would not if they had cable TV.
  - While more homes with modified, integrated computers do report currently experiencing TV EMI, further questioning reveals that the type of computer in the home (integrated vs. non-integrated) makes no difference in how often people attribute intermittent TV EMI directly to their computers.
  - However, those with integrated computers that have been modified from their FCC-tested configuration are more likely to attribute intermittent radio interference directly to their computers, indicating radios may be more easily effected by the EMI from computers.
  - Taking into account the higher rate of intermittent radio EMI reported in homes with integrated computers, at most an additional 0.06% of homes with computers (or 1 in 1,600) may be experiencing radio EMI that they would not if they had a non-integrated machine.

Findings

TV and Radio Reception Problems in U.S. Households

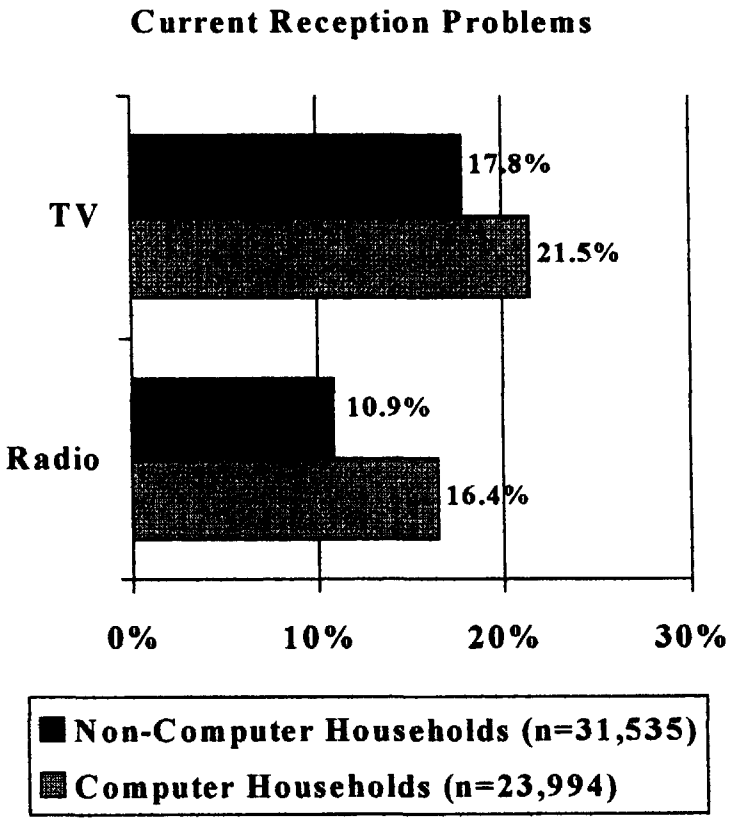
- About half of U.S. households have experienced some sort of TV reception problem at some point in time, with about 1 in 5 currently experiencing problems.
- Reported problems with radio reception are lower, with only about one quarter of households reporting radio reception problems at some point in the past, and fewer than 1 in 7 reporting current problems.



Base=All Households (n=55,529)

Current Reception Problems in Computer and Non-Computer Households

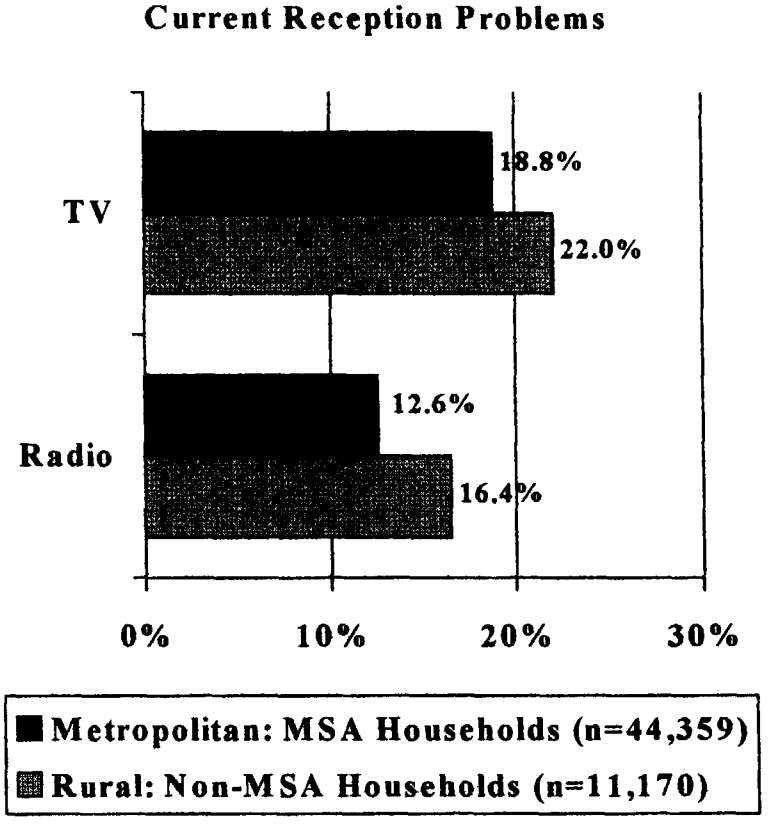
- In this survey, 43% of households indicated they had a computer in the home. This penetration figure is consistent with other recent measurements among CMP panel members, and is just slightly higher than reported figures of computer penetration in U.S. households, which range from about 35% - 40%.
- Households with computers are more likely to report current reception problems with both TVs and radios than households without computers.
- For the purposes of this study, it is important to determine whether households with integrated computers are more likely to experience reception problems than households with non-integrated computers.



Current Reception Problems in Metropolitan and Rural Areas

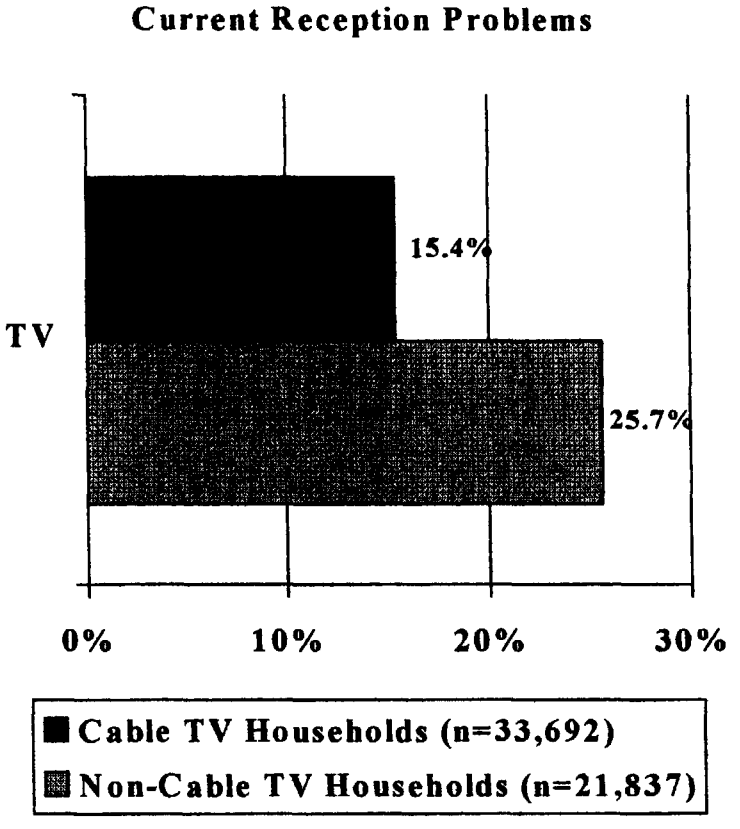
- Nearly 8 in 10 of the households surveyed are located in a metropolitan statistical area. MSAs are more densely populated areas than the more rural, non-MSA areas. This distribution is consistent with U.S. Census figures.

- As hypothesized, both TV and radio reception problems are reported more often in households located in less populous areas, presumably because households in rural areas are located farther from TV and radio transmitters.



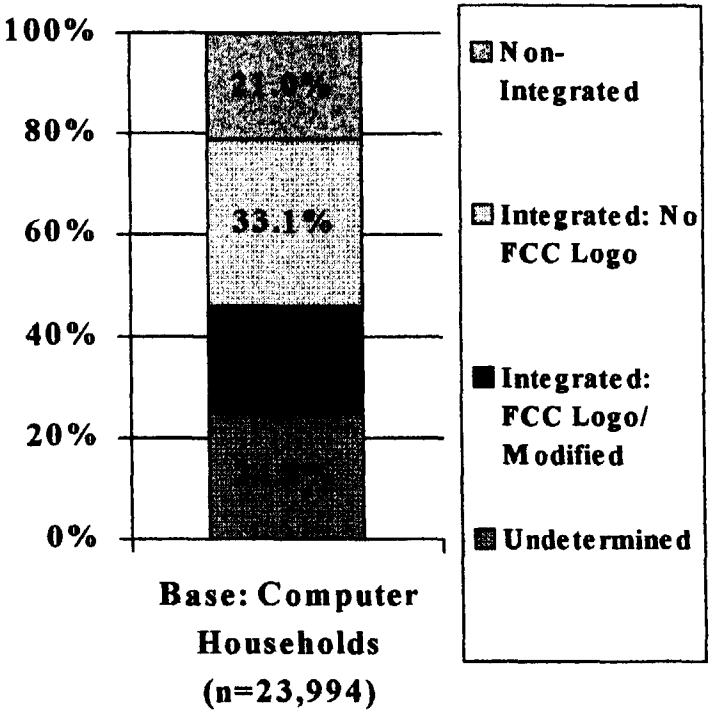
Current Reception Problems in Cable TV and Non-Cable TV Households

- Approximately 61% of households responding to the survey report having cable TV.
- As would be expected, TV reception problems are reported more often in households that do not have cable TV.



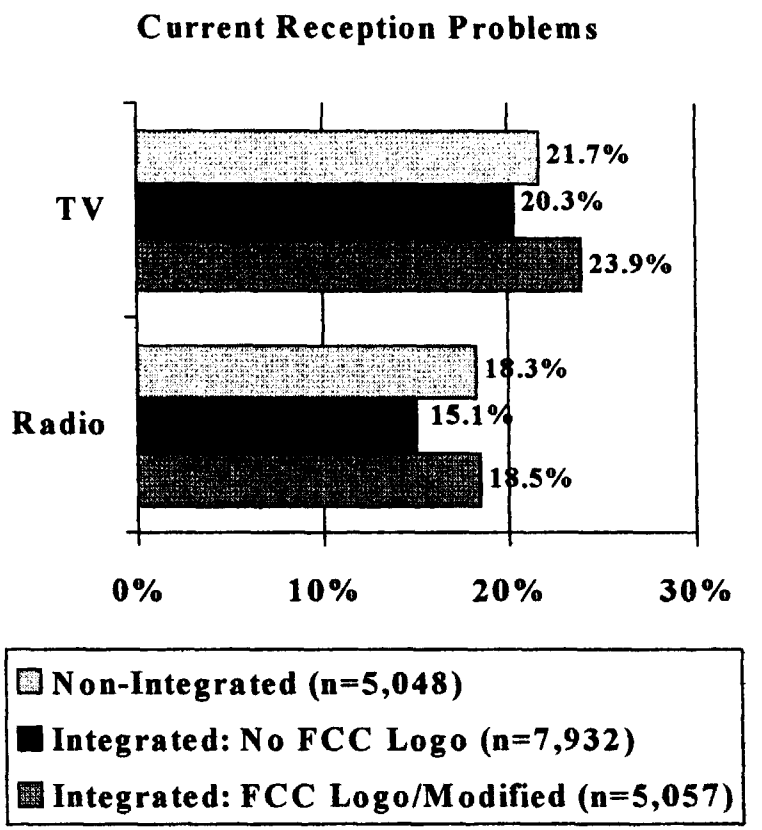
Integrated and Non-Integrated Computers in U.S. Households

- For this study, non-integrated computers are defined as those with an FCC logo on the box that have never been modified internally. Integrated computers are defined as those without an FCC logo or if they have the logo, they have been modified by the owner since purchase.
- About one quarter of respondents with computers in the home declined to report whether their computer has an FCC logo on the box, thus we are unable to determine whether these are integrated or non-integrated machines.
- However, based on those who did report both the presence of a logo and whether any internal modifications have been made, about 1 in 5 computer households can be classified has having non-integrated computers.
- Over half of computer households report having integrated computers, with the preponderance of machines with no FCC logo.



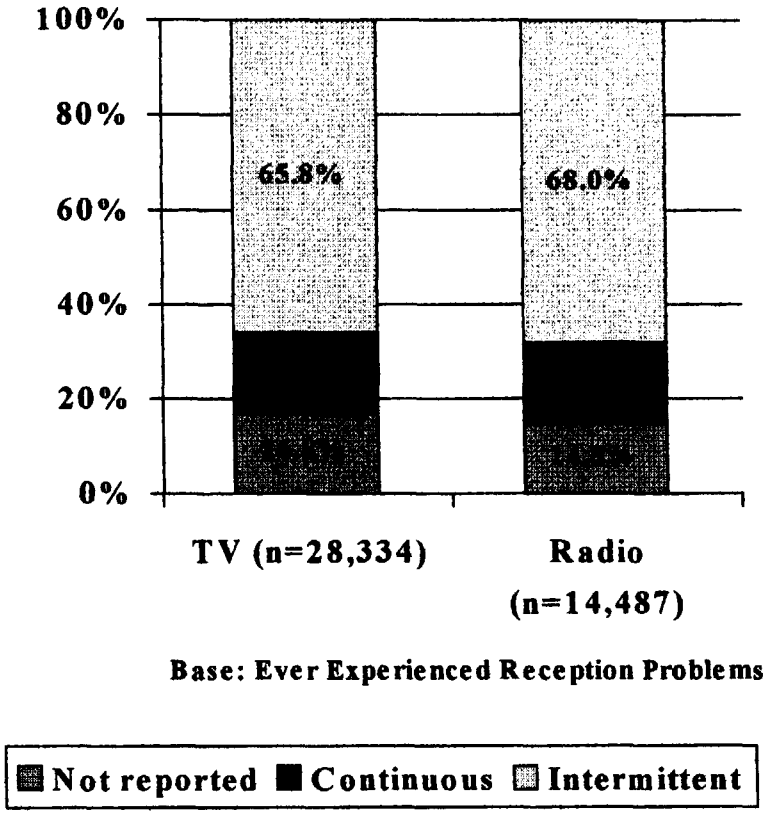
Current Reception Problems in Households with Integrated and Non-Integrated Computers

- Overall levels of current TV reception problems are higher in homes where a previously non-integrated computer has been modified than in homes with non-integrated computers or where the computer was never FCC tested.
- Levels of current radio interference are no higher in homes with integrated computers compared to homes with non-integrated computers.



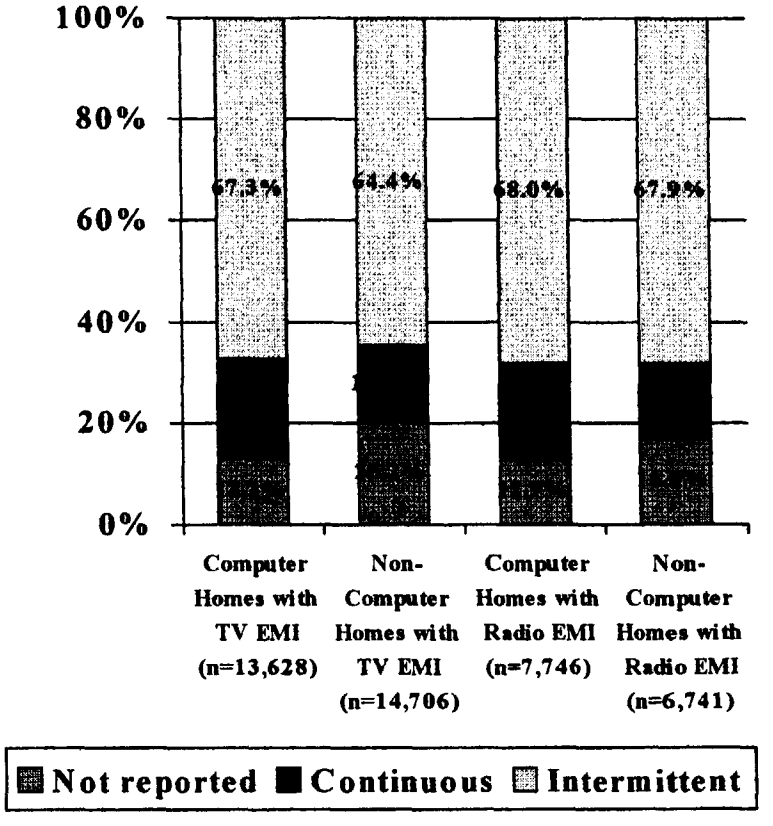
Type of TV and Radio Reception Problems in U.S. Households

- The type of interference most associated with computers and other household appliances is intermittent interference, which starts and stops when household appliances, like computers, are turned on and off.
- Most of the TV and radio interference experienced in US households is intermittent rather than continuous.
- Slightly more intermittent interference is reported for radios than TVs.



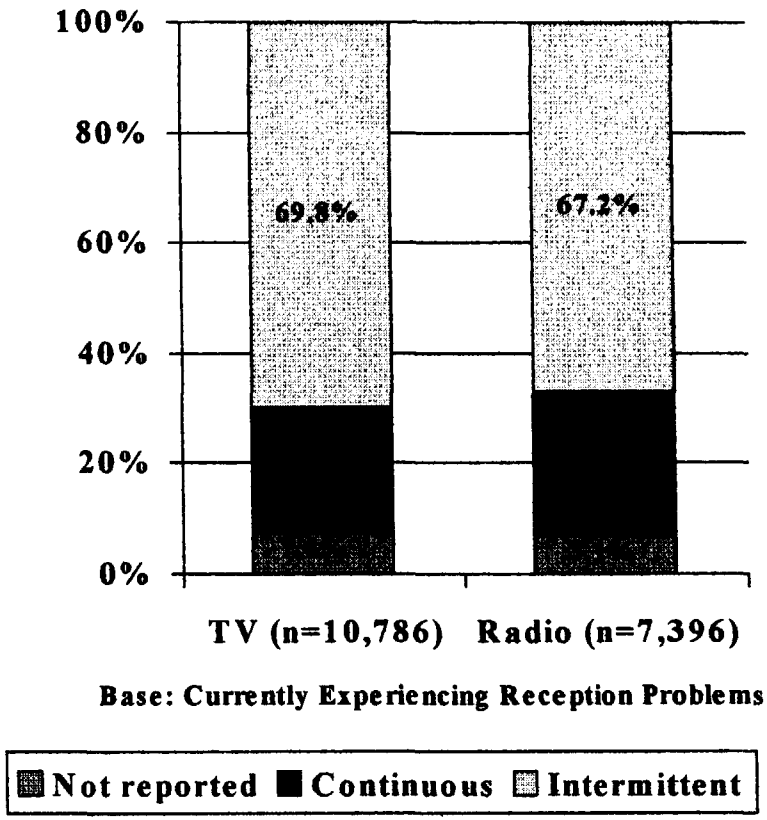
Type of TV and Radio Reception Problems in Computer and Non-Computer Households

- Homes with computers are somewhat more likely to report both intermittent and continuous TV interference than homes with no computer.
- Homes with computers are somewhat more likely to report continuous radio interference, though the proportion reporting intermittent radio interference is similar in homes with and without computers.



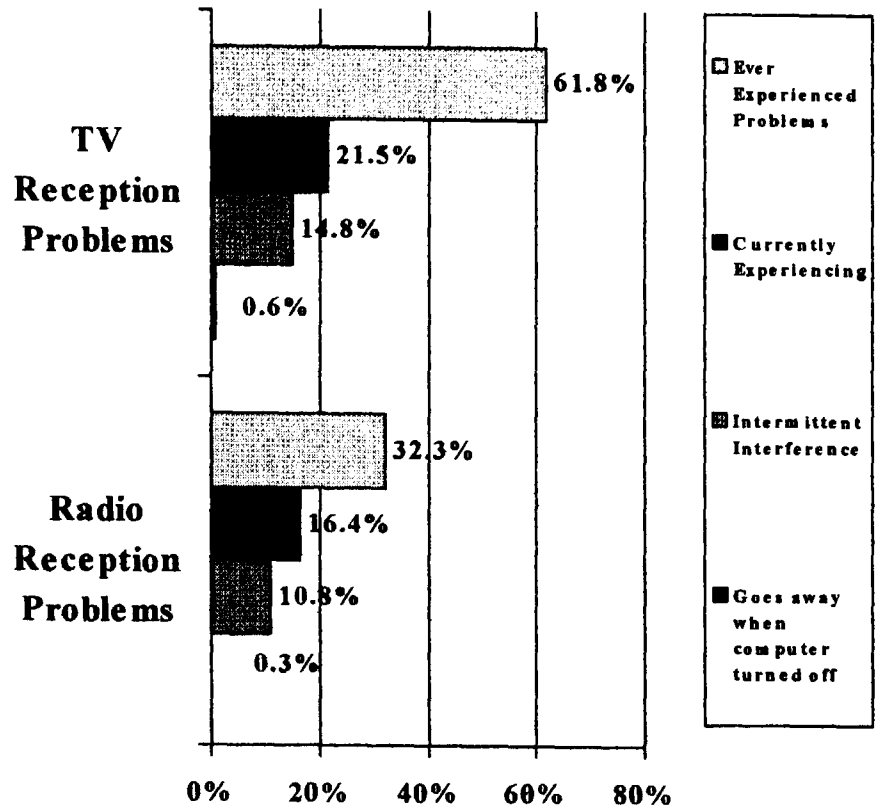
Type of TV and Radio Reception Interference Among Those Currently Experiencing Problems

- Households that are currently experiencing reception problems are better able to report the type of interference, with fewer respondents declining to answer this question.
- Intermittent interference continues to make up the bulk of current problems.
- With presumably more accurate reporting among those who are currently experiencing problems, intermittent interference is slightly more likely for TVs than radios while continuous interference is slightly more likely for radios than TVs.



Reported Effect of Home Computer on TV and Radio Reception

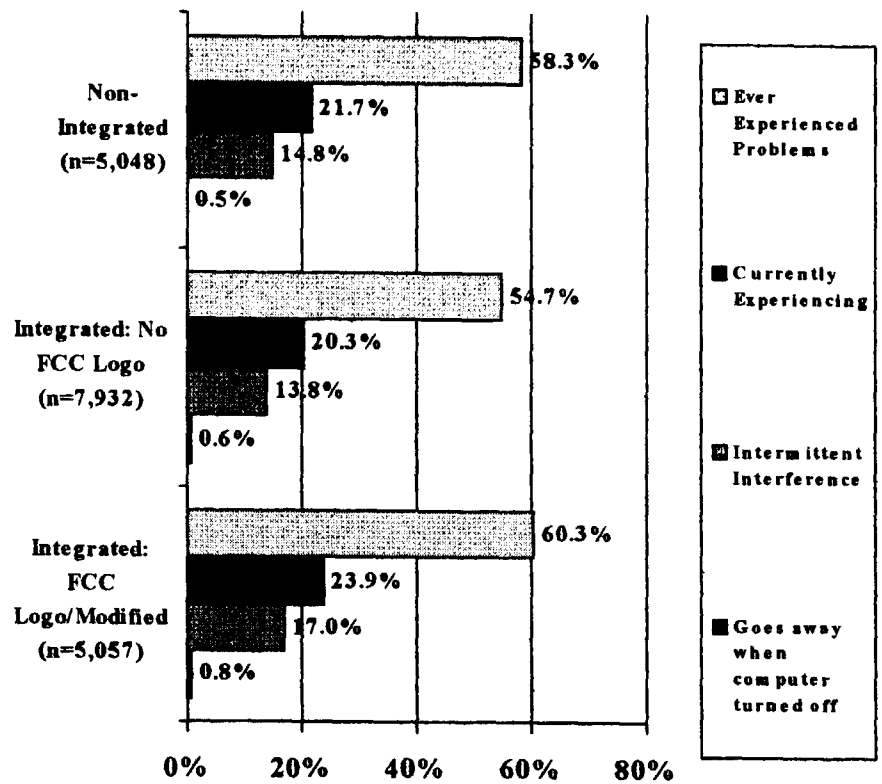
- While this study was designed to measure any type of interference, as mentioned earlier, intermittent interference is the type most associated with interference generated by home computers and other home appliances.
- Among those who are experiencing current intermittent interference on their TVs in households with computers, about 1 in 25 reports the interference problem goes away if the computer is turned off. This data leads to the conclusion that about 0.6% of households with computers, or 1 in every 162 computer owning households, have current intermittent TV interference problems that may be directly attributable to a computer.
- The comparable figure for radio interference is 0.3% of households, or 1 in every 324 computer owning households.



Base: Computer Households (n=23,994)

Reported Effect of Integrated and Non-Integrated Computers on TV Reception

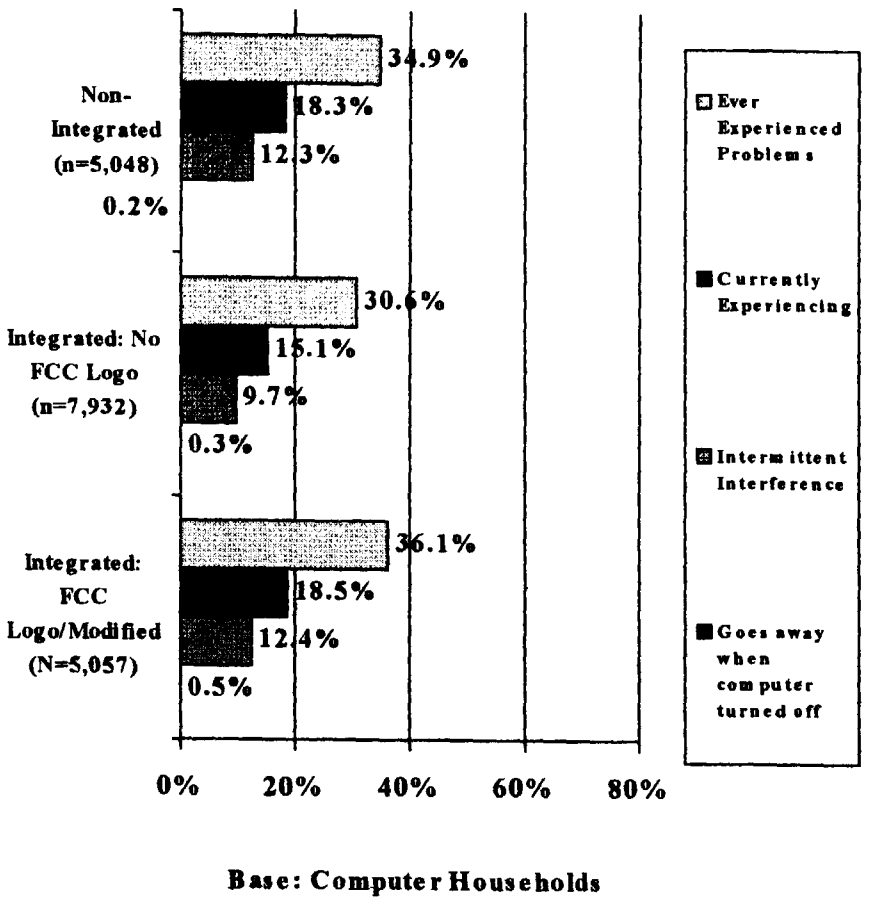
- Households with integrated computers are no more likely to attribute current intermittent TV interference problems to their home PC than households with FCC tested computers.
- While reported proportions of the interference going away when the computer is turned off in households with integrated computers is slightly higher than in households with non-integrated computers, this difference is not large enough to be statistically significant at this sample size.
- In order for these proportions to have a statistically significant difference, sample sizes would have to be four to five times larger.



Base: Computer Households

Reported Effect of Integrated and Non-Integrated Computers on Radio Reception

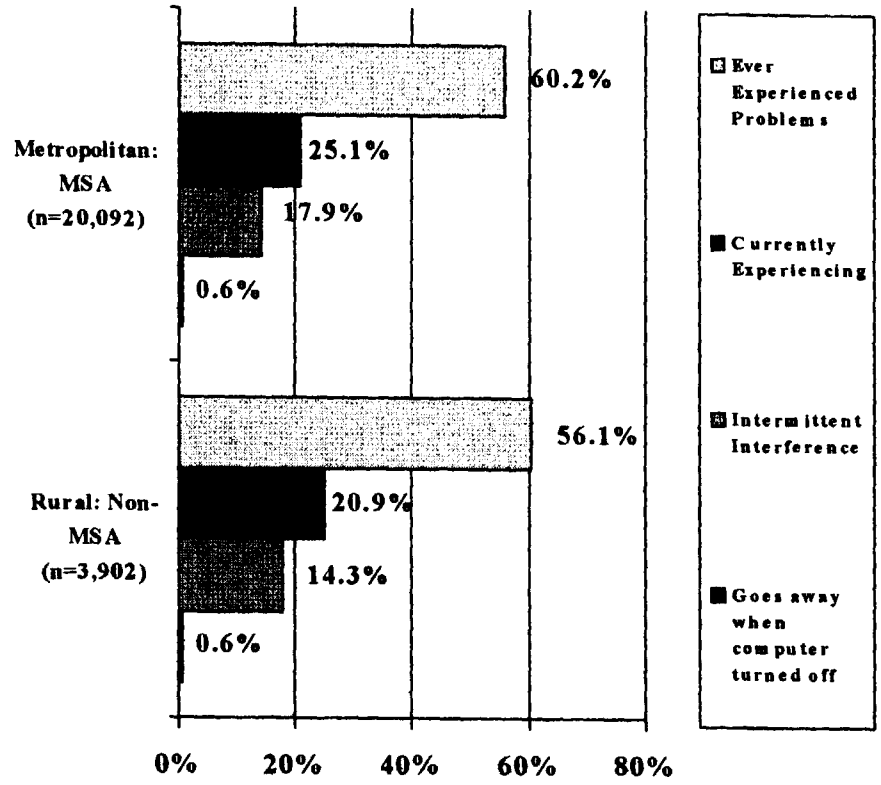
- Households with integrated computers that were FCC tested but subsequently modified are slightly more likely to attribute current intermittent radio interference problems to their home PC than households with non-integrated computers.
- It may be that that radio reception is more easily effected by EMI than TV reception



Base: Computer Households

Reported Effect of Computers on TV Reception in Metropolitan and Rural Areas

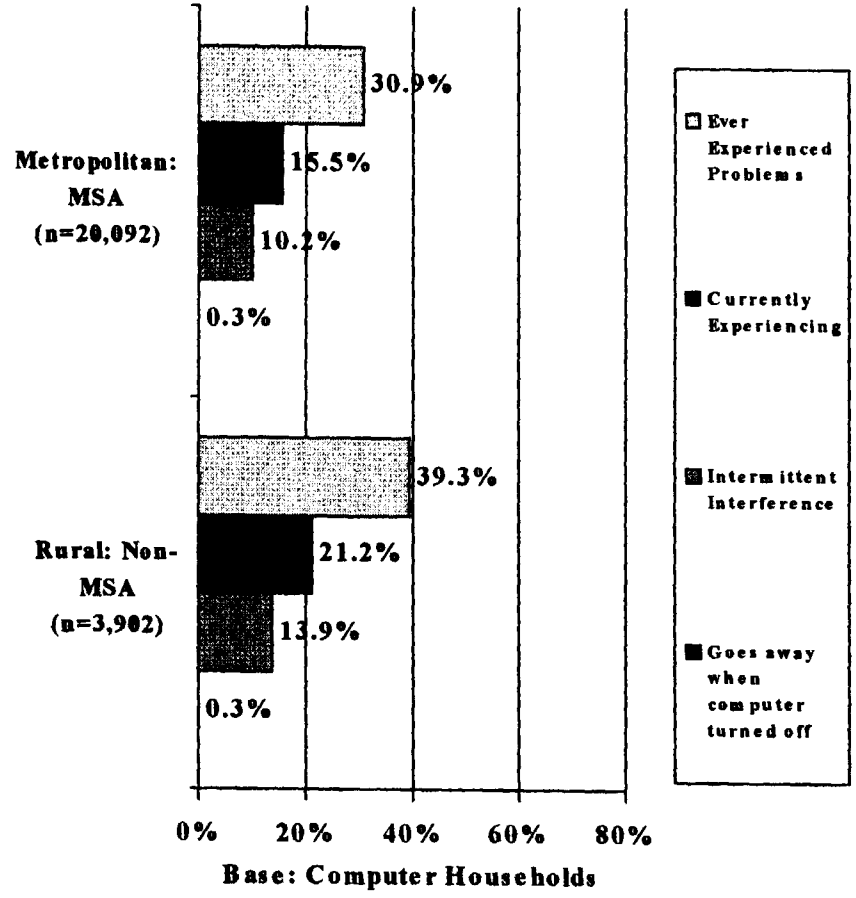
- The incidence of computers interfering with TV reception is essentially the same in metropolitan and rural areas.



Base: Computer Households

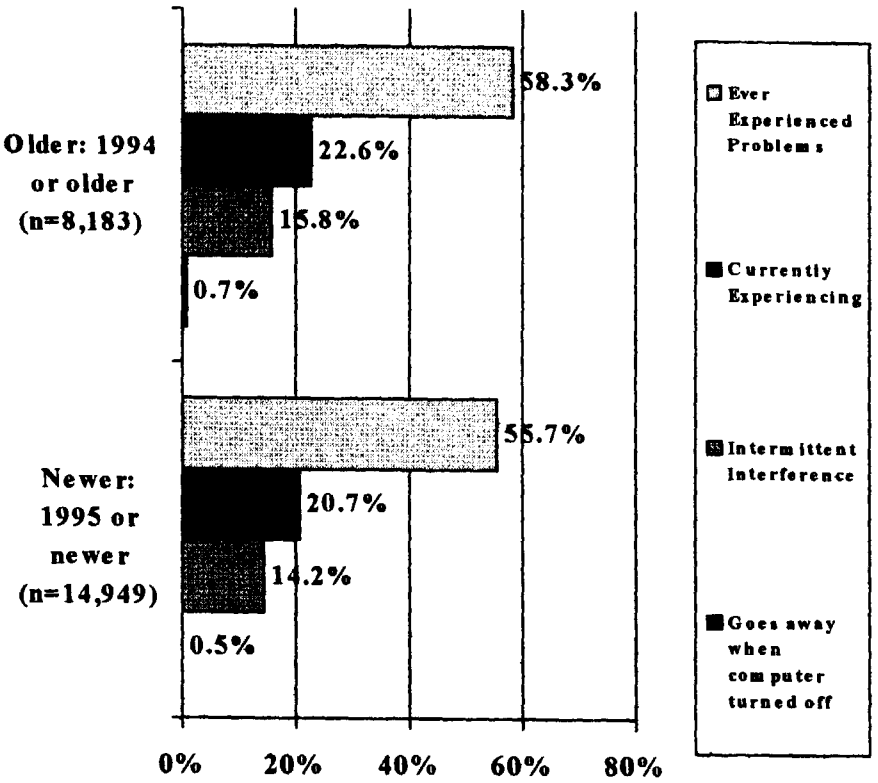
Reported Effect of Computers on Radio Reception in Metropolitan and Rural Areas

- Respondents are no more likely to attribute radio interference to computers in metropolitan or rural areas.



Reported Effect of Older and Newer Computers on TV Reception

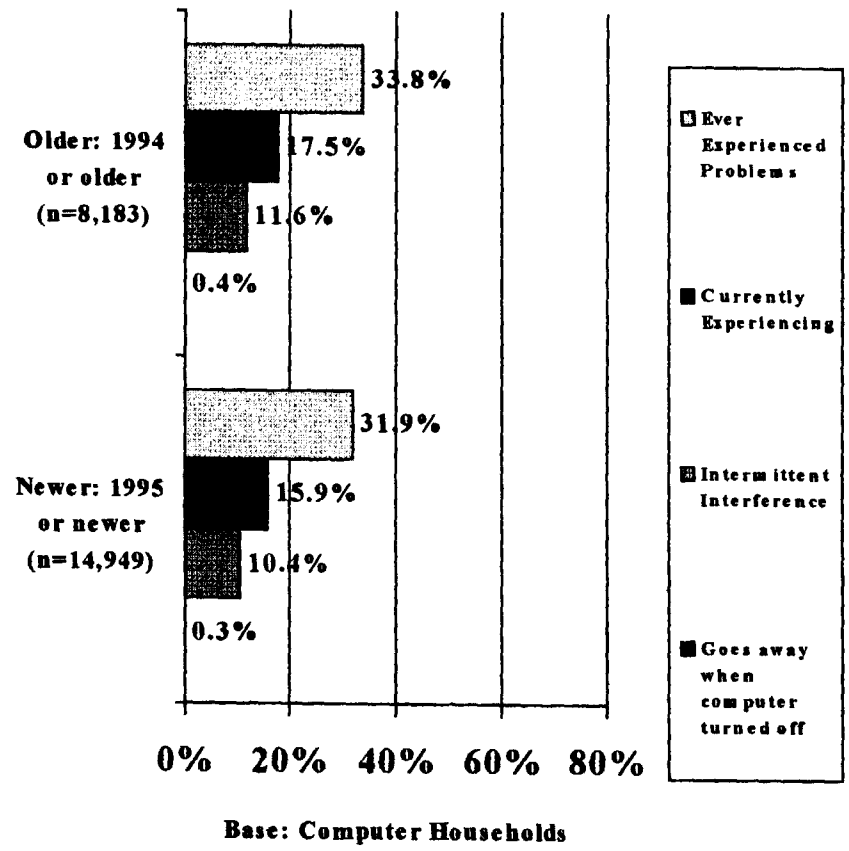
- Of those reporting the age of their computer, just over 6 in 10 have machines made in the past three years (1995 or newer).
- Respondents are no more likely to attribute current intermittent interference to an older computer than to a newer one.
  - While the proportion of interference attributed to older computers is slightly higher than for newer computers, the difference is not enough to be statistically significant.



Base: Computer Households

Reported Effect of Older and Newer Computers on Radio Reception

- Respondents are no more likely to attribute radio interference to an older computer than to a newer one.



Questionnaire

PLEASE CONSULT WITH OTHER HOUSEHOLD MEMBERS AS NECESSARY TO ANSWER THESE QUESTIONS ABOUT THE TVs, RADIOS AND COMPUTERS IN YOUR HOUSEHOLD.

1. How recently have you or other household members experienced TV or radio reception problems in your home?

	TV Reception Problems	Radio Reception Problems
Currently experiencing	❑	❑
Not currently, but within past 5 yrs	❑	❑
More than 5 yrs ago	❑	❑
Have not experienced	❑	❑

2. For the **MOST RECENT** reception problem, "X" the circumstances below.

	TV	Radio
Type of Reception Problem "X" ONE PER COLUMN		
Continuous (constant, non-stop)	❑	❑
Intermittent (starts and stops)	❑	❑
Effect of Home Computer "X" ONE PER COLUMN		
Reception problem goes away when home computer is turned off	❑	❑
Does not go away when home computer is turned off	❑	❑
Not sure of effect of home PC	❑	❑
Don't have a home computer	❑	❑

Questionnaire

(continued)

3. Does the reception problem stop and start on it's own, without turning household appliances (including PCs) on and off?

❑ Yes ❑ No ❑ Not sure

4. "X" the types of reception in your home.

	TV	Radio
Cable (CATV)	❑	❑
Satellite dish	❑	❑
Antenna inside	❑	❑
Antenna outside	❑	❑
No antenna	❑	❑

5. Please answer the following questions about the personal computer in your home. If you have more than one computer, answer for the computer that remains on the most.

"X" here ❑ if you do not currently have a home computer.
RETURN CARD

A. Approximate year manufactured 19_____
(write in best guess)

FC

B. Is there an FCC ID # OR logo on the computer "box" (CPU)? (Check the back or bottom).
Yes ❑ No ❑

C. Has this PC ever been modified inside (for example added or upgraded boards, drives, etc.)?
Yes ❑ No ❑

Intel Government Affairs
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[redacted]

EX PARTE OR LATE FILED

intel

October 8, 1998

VIA HAND DELIVERY

Magalie Roman Salas, Esq.
Secretary
Federal Communications Commission
1919 M Street, N.W.,
Washington, DC 20554

Re: Reported order 96-208 Amending Parts 2 and 15 of the Commission's Rules to Deregulate the Equipment Authorization Requirements for Digital Devices
ET Docket No. 95-19
Notice of Oral Ex Parte Presentation

Dear Ms. Salas:

On Thursday, October 8, Doug Probstfeld and Peter Pitsch of Intel met with Dale Hatfield, Bruce Franca, Julius Knapp, Anthony Serafini, John Reid, Karen Rackley and Phillip Inglis of OET. During that meeting, the discussion included a review of a Market Facts survey conducted for Intel on EMI affecting TV and radio reception in the home and the costs and benefits of the FCC's Part 15 regulation of CPU boards. The attached handouts were presented.

Pursuant to Section 1.1206(b) of the Commission's Rules, an original and one copy of this letter are being submitted to the Secretary's office and a copy is being provided to Hatfield, Franca, Knapp, Serafini, Reid, Rackley and Inglis. Please inform me if any questions should arise in connection with this filing.

Respectfully submitted,

Peter K. Pitsch

Peter K. Pitsch

cc: Dale Hatfield
Bruce Franca
Julius Knapp
Anthony Serafini
John Reid
Karen Rackley
Phillip Inglis